

**U. S. PATENT APPLICATION**

**OF**

**WILLIAM REEVES**

**FOR**

**COMPUTER INSTRUMENTS AND EMERGENCY MONITORING DEVICES**

**FOR RETRIEVING AND DISPLAYING STORED MEDICAL RECORDS**

**FROM BODILY WORN DEVICES**

**CERTIFICATION OF MAILING UNDER 37 CFR 1.10**

"Express Mail" mailing label number EK255363138 US Date of Deposit: 5/31/00

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner for Patents & Trademarks, Attn: Patent Application Branch, 2011 South Clark Place, Crystal Plaza 2, Arlington, VA. 22202

Name: William F. Reeves Signature: William F. Reeves

# **COMPUTER INSTRUMENTS AND EMERGENCY MONITORING DEVICES FOR RETRIEVING AND DISPLAYING STORED MEDICAL RECORDS FROM BODILY WORN DEVICES**

## **5           1. Abstract**

A method and device is disclosed herein to teach either patient monitors with microprocessors and screen displays and portable devices with screens and dedicated desk top monitors with displays for programming and retrieving stored and encrypted medical records and patient information onto bodily worn storage  
10 devices and/or digital storage cards and digital storage disks. Also disclosed is a unique interface wand, electronic circuitry and software for transmitting and receiving by directions digitized medical records and data.

## **2. Background of the Invention**

Simple, bodily worn, medical bracelets and medallions have been used for  
15 many years by individuals with serious medical conditions to alert emergency medical personnel in the event the wearer is stricken and unconscious that the wearer has a serious pre-existing medical condition which requires special medical treatment. Although these simple bracelets and pendants have been useful they lack the space and storage capacity necessary hold critical lifesaving medical  
20 information and any electronics to interface with modern patient monitors and or electronics. Such critical lifesaving information includes: blood type, a description of pre-existing medical conditions, photo ID or other positive identification, ECG scan, Cardiac, Ultrasound scan, present drug usage and interaction cautions, severe drug and other allergic reactions. The invention disclosed herein, and  
25 complimentary inventions disclosed by the inventor, teach the design of bodily worn devices which can store large amounts or digital medical records and have those records retrieved in a rapid wireless manner in the event of a medical emergency The Bodily Worn Device (BWD) can also be embodied into a digital storage card and/or medical computer disk which is disclosed in another invention by this  
30 inventor. Also, other key medical and personal information which can be stored into the bodily worn digital devices include Organ Donor Instructions and Living Will

instructions which have become very common place and vital to the medical community as well as the individual. Integral to the use of the Bodily worn digital storage devices (BWD) are the inventions disclosed herein which are medical monitors, personal computers, portable display devices and interface electronics

5 used to organize medical records, as an option- encrypt the records for security, transmit the records through interface electronics and "burn in" the data on computer chips and other suitable storage media located within and part of the BWD. There are several embodiments of the invention disclosed herein which will most likely be the most convenient and usable commercial versions of the invention. These

10 include: 1. a portable field unit which will include a display screen, microcomputer, interface wand, software, and a means of transmitting data back to a base unit in an emergency 2. an interface module which, in lieu of an entire new patient monitor, can be added to an auxilliary electronic card slot in an existing patient monitor and add the capability of accepting data from the Interface Wand and BWD without

15 adding a lot of additional cost to the health care system, 3. a more substantial Base Unit which would be most likely a PC based system and include software for organizing and editing medical data and records, as an option- encrypting those records for confidentiality and security, and sending those records directly through the Interface Wand to be "burned in" and stored within the BWD in digital storage

20 media such as a computer chip. Although there are many "canned" and "off the shelf" software packages currently available there is none which would allow for a concise, highly organized and standard format for displaying of emergency medical records. Since time is of the essence and correct treatment and medical intervention is often a life or death situation it is essential to have the stored

25 medical records in a highly organized, concise standard format so an EMT can go right to the critical information, assess the best medical treatment options and act accordingly. This highlights the need for unique software to organize the emergency medical records and information into concise and edited format for easy use and such software is disclosed herein as part of this invention.

30 There has been prior art in the medical industry which, although peripherally related to medical records and computer systems, does not teach the art or devices

described herein. Doue in 5,361, 202 teaches a computer system and software specifically for the purpose of managing a patients stay in a hospital or clinic. Doue makes no mention of organizing or applying any critical emergency medical information, makes no mention of using or interfacing with Bodily

5 Worn Devices or Medical cards and in general Doue's invention in no way completes with the invention disclosed herein. Since the invention disclosed herein is not used in any way, and makes no claims to manage the time frame for a patients stay in a hospital, these two patents really have nothing more in common than the fact that they use a screen and a microprocessor. Whalen in 5,327,341 teaches a computer  
10 system and software for managing general medical records and files in a hospital and physician office environment. Whalen focuses on the software side of his invention and teaches means of creating headers and organization categories for large amounts of medical information. No where in his invention does Whalen teach organizing Emergency Medical information for emergency medical treatment which  
15 is created for the purpose of storage on Bodily Worn and/ or Digital Storage cards or disks. No where does Whalen teach any of the Interface Wand, Interface module and data transmission features of the devices disclosed in this invention. The main claims of the Whalen patent deal with managing and updating an individuals medical records in a routine office based setting using key words, hybrid data fields ,etc.,  
20 which this invention is not claiming and for applications this invention has no intention of addressing. Eberhardt in 5, 659, 741 teaches a medical history computer system for recording medical histories aimed at organizing very large amounts of medical data for organizations such as the federal government for keeping track of medicare and medicaid and/or for large insurance companies. This  
25 differs from the invention disclosed in that the emergency medical data described herein is not stored in a central computer but is organized and stored on Bodily Worn devices. The inventions described herein are patient monitors and interface hardware specifically aimed at retrieving and displaying the stored emergency medical data . Eberhardt fails to teach any of the patient monitors, modules or  
30 interface electronic hardware necessary to make the retrieval of emergency medical data a practical device. Although Ebehardt mentions cards or disks

to carry medical records he fails to teach any type of practical card or disk fails to teach how such a card or disk would be interfaced with a practical computer system or its components. An integral part of Ebehardt's inventions, which is not required by the invention disclosed herein, is the ability to sort for medical information and/or data by key word, phrase, etc.. This is not necessary for the invention described herein in terms of its software and is outside of the scope of this invention.

### 3. Summary of the Invention

The invention disclosed herein has several different embodiments described in the Background narrative. What all of these embodiments have in common is:

- interface hardware and electronics, embodied in the form of the Interface Wand and electronic card module, for electrically powering and retrieving the data from the bodily worn devices in a wireless, non-contact fashion

- software which is compatible with the software and organization platform of the Bodily Worn devices for retrieving, organizing and displaying the stored records in rapid format for emergency situations.

- some form of a screen display which could include an LCD screen, video screen, cathode ray tube, or computer screen for displaying the records in emergency situations.

- a means of periodically updating the records stored on the Bodily Worn devices by interfacing the Bodily Worn device with the monitors, either using the Interface wand and a direct connection to a monitor or via the wand and an interface box which could be used to modem information into the Bodily Worn device from a remote location.

- as an option but not a requirement - a means, through unique software encryption and recognition techniques, to interface with unique smart cards and/or unique computer disks which have permanently imbedded software security identification markers. This type of a marker and recognition system allows for only authorized types of disks and card, which have the unique embedded digital markers, to be used and recognized by the system software for security and anti fraud purposes. The alternative, which is an embodiment

of this invention, is to have an open architecture software.

-smart software and two way data transmission between the interface hardware and the Bodily Worn devices and cards and disks. This smart software allows for recognition of encrypted security markers to eliminate unauthorized entry to the devices and well as for anti fraud purposes during data transmission.

-electronic cases and enclosures which make the devices herein either rugged and portable for field use and/or military use, enclosures and electronic covers for the module. Interface to safely add the module and upgrade to an existing patient monitor, or an enclosure for making the devices desk top and fairly stationary for use in an office environment.

### **Detailed Description of the Invention**

#### **Reference Figure 1**

Figure 1 represents a flow chart of how the integral hardware components of the system would interface. Either the portable field unit 29, patient monitor module 30 or base unit monitor 28 can send or retrieve data from the Bodily Worn Devices 32 (BWD) via the Interface Wand 31. In turn, either the Portable Field Unit 29 or the Patient Monitor Module 30 can also send data to and from the Base Unit Monitor 28 via either telephone lines, wireless AM or FM transmission or any other appropriate transmission means. The interface wand 31 is an integral part of the system for sending and retrieving data from the BWD 32. The Interface Wand 31 has a means of simultaneously sending electrical power to the BWD 32 via wireless inductance means while at the same time sending and retrieving data from the BWD 32 via either optical or wireless data transmission. The detailed disclosure of the art of the Interface Wand 31 and BWD 32 are covered in another US patent filing by this inventor. As previously described the portable field unit 29 and and from the Interface Wand 31, to display medical data on a screen for Emergency Medical treatment, and to send the data wireless or over telephone lines to other stations. The patient monitor module 30, which is an electronic card which fits into an existing patient monitor, is described in more detail in figure 5. Common software allows the

devices disclosed herein to communicate, send and retrieve data and encrypt data in secure means for confidentiality and security.

**Reference Figure 2**

5           Figure 2 shows a schematic of the software and its flow in terms of data transmission through the various pieces of hardware in the system. Two way data transmission is important through each piece of hardware to allow for medical data and records to be both sent and retrieved through the Interface Wand 26 and into and out of the BWD 27. As shown in figure 4 Emergency Medical Records 16 are  
10 organized by the software into pages or files 17 with discrete information organized in sections or blocks to create a standard page. This standard page 17 is important in that in the event of medical emergency time is critical and if a standard page is created for EMT's and technicians then they know exactly where to look to get critical life saving information without searching. The software is organized as  
15 such so that Emergency Medical records are created for a patient either from the Base Unit 24, Portable Field Unit 25 or Ambulatory Patient Monitor 28, but most preferably in the Base Unit 24. The Patient files 17 are encrypted to provide for security during transmission over telephone and data lines. The software is organized as such so the patient files are transferred through the Interface Unit 26  
20 or Wand into the BWD 27 in file or page format. These patient files 17 are organized through the software in generic ASCII type files so as to be retrievable and readable using standard software packages in conjunction with our unique decryption software. As an alternative and/or enhancement to the encrypting of the medical files security software markers could be written into the medical record files  
25 so that only persons with compatible software which can recognize the security markers would be allowed to retrieve and open the medical records 17 stored on BWD's 27 or on electronic cards or disks.

**Reference figure 3**

30           Figure 3 shows one variation of how all of the components of the system work including the Bodily Worn Device 21, Interface Wand 20, Portable field unit 19, Base unit 18 and controlling software. When the wearer of the BWD 21 is stricken with

any illness or is in an accident, etc. an EMT, paramedic, military corpsman, etc, can access the critical medical data using the portable field unit 19, assess the stricken persons overall condition using the pre-existing medical history and data in the BWD 21, and rapidly determine the best coarse of medical treatment, which could prove life saving. The portable field unit 19 has the ability to transmit medical data and treatment options to the base unit 18 and visa versa, so hospital based medical personnel can communicate directly with the field paramedic.

An integral part of this invention is the design and inter-related working mechanism between the BWD 19, storage cards 7 and storage disks 3. This is expanded on in figure 6 of this invention.

#### **Reference figure 4**

Figure 4 shows one typical software configuration for the Emergency Medical Record organization. The medical data 16 can either be in file or page format 17 with discrete blocks or sections of a page devoted to specific information so as to create a standard and easily recognizable format in an emergency situation. Menus or point and click software commands can be set up so as to allow the user to rapidly scroll through pages to find information.

#### **Reference Figure 5**

Figure 5 shows one typical configuration for the hardware module which would be used in conjunction with an existing patient monitor in an ambulance, emergency room, etc. The plug in module 15 consists of a faceplate with controls, switches 8 , for on/off power, data transmission indicator lights, power indicator light and any other appropriate controls and indicator lights. An Input/Output type printed circuit card 9 is mounted to the faceplate and all electronic components and circuitry are mounted to the pc board. The electronic circuitry for supply power to the board, as well the circuitry which routes the data signals through the card, are routed to electronic contact pads or fingers 10, as they are known in the industry. The pads 10,11,12 are either silver or gold plated and allow the pc board 9 to be plugged into the mating slot in the patient monitor so as to accept electrical power from the patient monitor



and allow medical records and data to be transmitted and received through the pc board 9 and its connecting pads. As previously described the data cable 14 connects the Interface wand 13 to the front panel of the module 15. The cable 14 allows data to be transmitted from and sent to the Bodily worn devices using either  
5 fiber optic, serial or parallel two way data transmission.

### **Reference Figure 6**

As previously mentioned the design and working mechanism of the Interface wand 1, as it relates to Bodily Worn Device 2 or Card or Disk 3& 7 , is critical. The two devices and their working mechanisms as described herein are unique and  
10 novel. This inventor has also written and submitted a separate patent on the Digital Card and Disk 3& 7 and mechanisms to read and transmit data. Figure 6 shows three typical embodiments of this invention and this is not to say that more embodiments do not exist which are contemplated by this inventor. The Interface wand 1 is designed in Embodiment a) to include a housing, electrical power pads to  
15 supply power to the BWD 2 via inductance or other non-contact means, data transmission 8 and retrieval capacitance pads 9 to allow bi-directional flow of digital data in a non-contact manner, a means of aligning the wand and BWD so as to make positive mechanical alignment between the power 9 and data pads 8 . Embodiment b) shows an alternative design of the Wand whereby a case or slot  
20 enclosure 4 will allow either the BWD 2, a card or disk 3 & 7 to be inserted into the slot. The power pads and data transmission pads are mounted on the interior wall of the enclosure 4 so as to provide protection in the event the wand is dropped or hit. The slot enclosure and BWD, card, disk 3 are designed so the electrical power pads 9 and data pads 8 make proper alignment when the BWD 3 is inserted and hits a  
25 mechanical stop in the slot. Embodiment c) shows a wand 6 with a mechanical slot for insertion of a storage disk or card 7. In this embodiment only an optical read/write pad 5 is required. Since the digital data is stored on an optical film or polymer on the surface of the disk or card 7, in a similar manner as a compact disk, neither the wand nor disk 7

- 30 require any power to retrieve the digital information from the disk 7. It should be noted that power is required to be sent to the optical scanner in the wand so as to power its operation. The bi-directional reading and writing of data to and from the disk or card 7 can be accomplished with a plurality of optical scanner / writer pads 5 mounted to the inside of the wand enclosure 6.